C. REMARKS/ARGUMENTS

1. Rejection of Claims 1, 2, 4-17, and 19-22 Under 35 U.S.C. § (112) ¶ 1

Claims 1, 2, 4-17, and 19-22 stand rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for determining voltage between a cathode and an x-ray emissive target, does not reasonably provide enablement for determining the operating voltage for other components in an x-ray apparatus.

In response, Applicant has amended independent claims 1 and 16 (see section B above), to include the limitation that the x-ray apparatus includes an x-ray source that is configured to generate the x-rays, and that includes an electron source and an x-ray emissive target. Claims 1 and 16 have also been amended to include the limitation that the first and second operating voltages are operating voltages of the x-ray source.

As stated by the Examiner in the Office Action, the specification does disclose determining and setting operating voltages in an x-ray source (e.g. an x-ray tube). See e.g. specification paragraph [0024] , 5th line: ". . . *The kVp of the x-ray source 14, i.e. the x-ray source operating voltage, provides the accelerating voltage for accelerating the electrons from the electron source towards the x-ray emissive target 30.* . . . "

Applicant therefore respectfully submits that the above-described amendments to claims 1 and 16 overcome the above §112 ¶ 1 rejection to these claims, as well as the §112 ¶ 1 rejection to claims 4-5 and 7-15 (all of which depend on claim 1), and 19 - 22 (all of which depend on claim 16). (Claims 2, 6, 17, and 19, directed to limitations that have now been added in section B by amendment to claims 1 and 16, have been cancelled.)

Applicant submits that the above rejection of claims 1, 2, 4-17, and 19-22 under 35 U.S.C. 112, first paragraph, has thereby been overcome.

2. Rejection of Claim 18 Under 35 U.S.C. § 112 ¶ 2 / Allowable Subject Matter

In response to the Examiner's rejection, claim 18 has been amended to delete the redundant limitation directed to operating voltage.

Applicant submits that the rejection of claim 18 under 35 USC § 112 ¶ 2 has thereby been overcome.

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3. **Rejection of Claims 1, 2, 7, 8, 11, and 15 under 35 U.S.C. § 102(b)**

Claims 1, 2, 7, 8, 11, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,501,819 to Unger et al. ("Unger"). In particular, the Examiner noted that the features relied on by Applicant to distinguish the present application from Unger were not recited in the rejected claims.

In response, Applicant has amended independent claim 1 to include the limitations that the first sampling interval and the second sampling interval are each relatively small compared to the total exposure period.

The subject matter of Unger is distinguishable from Applicant's application, which discloses a method and system for improving the quality of an image, obtained during a single x-ray exposure period, by operating the x ray apparatus at different operating voltages during sampling intervals that are much smaller than the single x ray exposure period of that image. In contrast, Unger discloses implementing two (or more) different x-ray exposures, each carried on during two separate x-ray exposure periods. The second exposure is described in Unger as being taken after the first image is segmented.

In particular, Applicant submits that the independent claim 1, as currently amended, is not anticipated by Unger, because Unger does not teach or suggest at least the following limitations of claim 1:

B. during a first sampling interval Δt_1 in the beginning of the x-ray exposure period, operating the x-ray apparatus at said first operating voltage level kVp_0 and using one or more sensors to detect x-rays that have passed through at least a portion of the object during the interval Δt_1, wherein the first sampling interval Δt_1 is relatively small compared to the x-ray exposure period;

C. after said first sampling interval Δt_1, processing the output signals from said sensors to determine a second operating voltage level kVp_1;

D. during a second sampling interval Δt_2 within the same x-ray exposure period, operating said x-ray apparatus at said second operating voltage level kVp_1 and using said sensors to detect x-rays that have passed through at least a portion of the object during the interval Δt_2, wherein the second sampling interval Δt_2 is relatively small compared to the x-ray exposure period; and

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E. after said second sampling interval Δt_2, processing the sensor output signals to determine an optimal value kVp_2 for the operating voltage level, and setting the operating voltage level of the x-ray apparatus to said optimal value kVp_2 for the remainder of the x-ray exposure period.

Element B is not anticipated by Unger. Column 4 lines 7-14 of Unger describe the acquisition of an entire first image during an entire x-ray exposure period, not the operating of an x ray apparatus during a first sampling interval that is much less compared to the x-ray exposure period, as required by amended claim 1.

Likewise, element C is not anticipated by Unger. Column 5, lines 22-33 of Unger describe selecting second image parameters (based on the characteristics of the anatomy). Col. 5, lines 22-33 do not describe determining a second operating voltage level by processing output signals from the sensors during a sampling interval that is small compared to the duration of the x ray exposure period for the same image, as required by amended claim 1.

Likewise, element D is not anticipated by Unger. Column 5, lines 34-36 of Unger describe using second image acquisition settings to obtain a second image. Column 5, lines 34-36 of Unger do not teach or suggest operating the x-ray apparatus at a second voltage level during a second sampling interval (within the same x-ray exposure period of the same image), where the second sampling interval is much less than the x-ray exposure period of the same image, as required by amended claim 1.

Finally, element E is not anticipated by Unger. Column 8, lines 25-27 of Unger described adjusting the exposure settings of a 3rd image (different from the first and second images) based on a second image (different from the first and the third images). Column 8, lines 25-27 of Unger do not teach or suggest determining an optimal value for the operating voltage level, after a second sampling interval (much smaller than the x-ray exposure period), and setting the operating voltage level of the x-ray apparatus to that optimal value for the remainder of the single x-ray exposure period, as required by amendedd claim 1.

For these reasons, claim 1, as currently amended, is not anticipated by Unger.

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Claims 2, 7, 8, 11, and 15

Claims 2, 7, 8, 11, and 15 all depend on claim 1, and therefore include all the limitations of claim 1. Claims 2, 7, 8, 11, and 15 are therefore also not anticipated by Unger.

4. Rejection of Claims 3, 5, and 6 under 35 U.S.C. § (103)

Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Unger *et al.* (U.S. Patent No. 6,501,819 B2) as applied to claim 2 above, and further in view of Macovski (U.S. Patent No. 4,686,695). Claim 6 is rejected under 35 USC 103 as obvious over Unger.

Applicant respectfully traverses.

For reasons described below, Applicant submits that claim 1 is not obvious over Unger, nor is claim 1 obvious over Unger in viewof Macovski.

It follows that claims 3 and 5, which depend on claim 1, are not obvious over Unger in view of Macovski, because claim 1 is not obvious over Unger in view of Macovski. Applicant submits that claim 6, which depends on claim 1, is not obvious over Unger because claim 1 is not obvious over Unger. ("If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." MPEP 2143.03; In re Fine, 837 F.2d 1071, 2 USPQ2s 1596 (Fed. Cir. 1988).)

Claim 1 is not obvious over Unger

For the reasons described in section 3 above, Unger does not teach or suggest all the limitations of claim 1, and in particular fails to teach or suggest at least elements B – E of claim 1, as currently amended.

One of the requirements a *prima facie* case of obviousness is that the prior art reference(s) (that form the basis for the obviousness case) must teach or suggest all of the elements and limitations recited in the claims. Since Unger does not teach or suggest at least elements B - E of amended claim 1, as explained above, claim 1 is not rendered obvious by Unger.

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Claim 1 is not obvious over Unger, or over Unger in view of Macovski

As discussed above, Unger does not teach or suggest all the limitations of claim 1.

Macovski fails to cure this defect. Macovski does not teach any of the elements of claim 1. The Examiner also does not state that Macovski teaches any of the elements of claim 1.

Because Unger and Macovski, either alone or in combination, fails to teach or suggest all the limitations of claim 1, claim 1 is not obvious over Unger in view of Macovski, (nor is claim 1 obvious over Unger).

Claims 3, 5 and 6 all depend on claim 1, and therefore include all the limitations of claim 1. For all the reasons discussed above, claim 1 is nonobvious under 35 U.S.C. 103 over Unger in view of Macovski. Also, claim 1 is nonobvious under 35 U.S.C. 103 over Unger. Accordingly, it follows that claims 3 and 5 (all depending from claim 1) are also nonobvious under 35 U.S.C. 103 over Unger in view of Macovski, and that claim 6 is nonobvious under 35 USC 103 over Unger.

5. Conclusion

On the basis of the foregoing amendments, Applicant respectfully submits that all of the pending claims are in condition for allowance. An early and favorable action is therefore earnestly solicited. If there are any questions regarding these amendments and remarks, the Examiner is encouraged to contact the undersigned at the telephone number provided below.

Respectfully submitted,

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